

(21) Application No 9224389.8

(22) Date of filing 20.11.1992

(30) Priority data

(31) 9124728

(32) 21.11.1991

(33) GB

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(51) INT CL<sup>5</sup>

A61G 7/10, A47K 3/12

(52) UK CL (Edition L)

A4N N2D1 N8B

(56) Documents cited

GB 2242126 A

US 4296508 A

GB 2222767 A

WO 85/05267 A

US 3994030 A

(58) Field of search

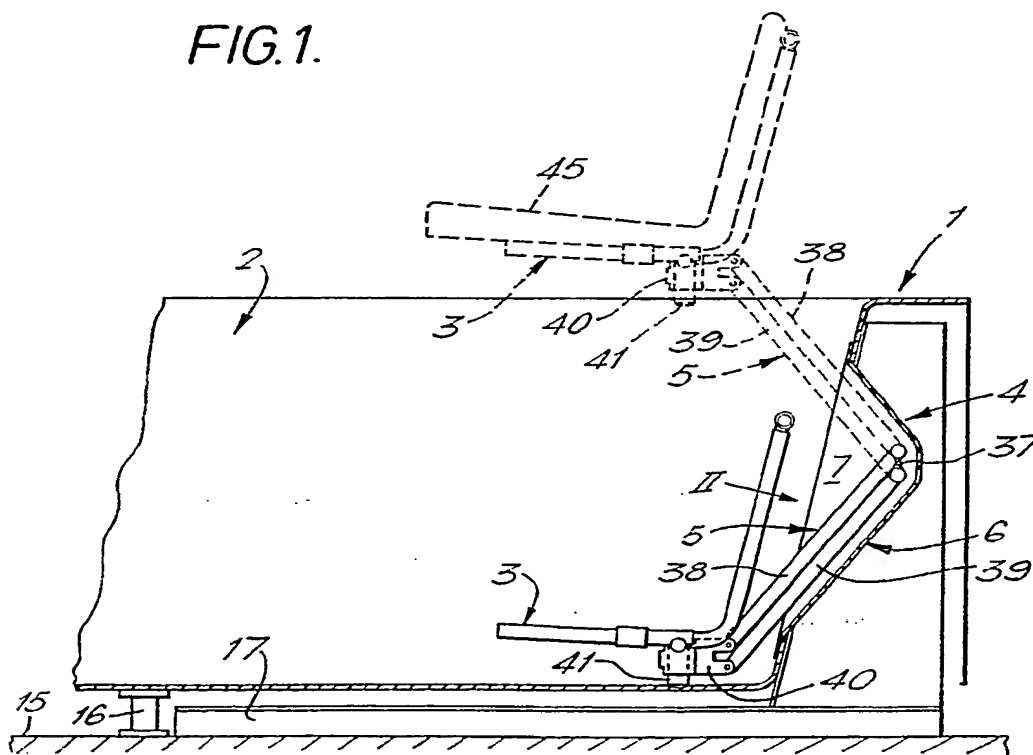
UK CL (Edition L) A4N N2D2 N8B

INT CL<sup>5</sup> A47K, A61G

(54) Baths for use by physically handicapped persons

(57) A bath 1 for use by a physically handicapped person comprises a bath structure 2, a rotatable seat support 3 disposed within the bath structure 2 and means 4 for raising and lowering the seat support 3 within the bath structure 2. The means 4 comprise mechanical linkage 5, disposed at least in part within a housing 6 forming an outward extension 7 of the bath structure 2, and actuator means 8 (Figure 3) for operating the mechanical linkage 5. The actuator means (8, Fig. 3) may be a bellows operated by a pressurized water source such as the cold water supply to the bath 1 or it may be in the form of hydraulic actuators (60, Fig. 5).

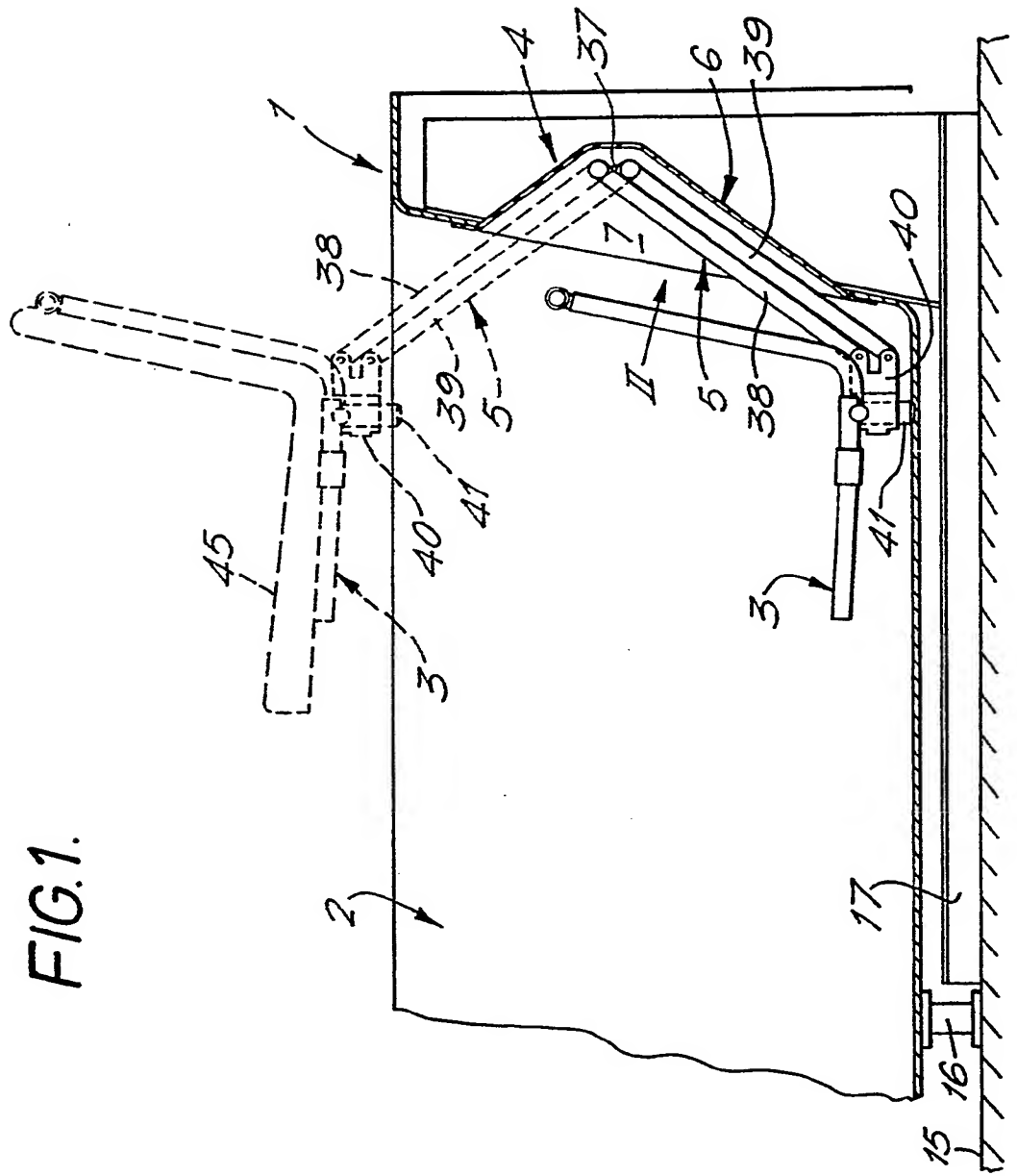
FIG.1.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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FIG.1.



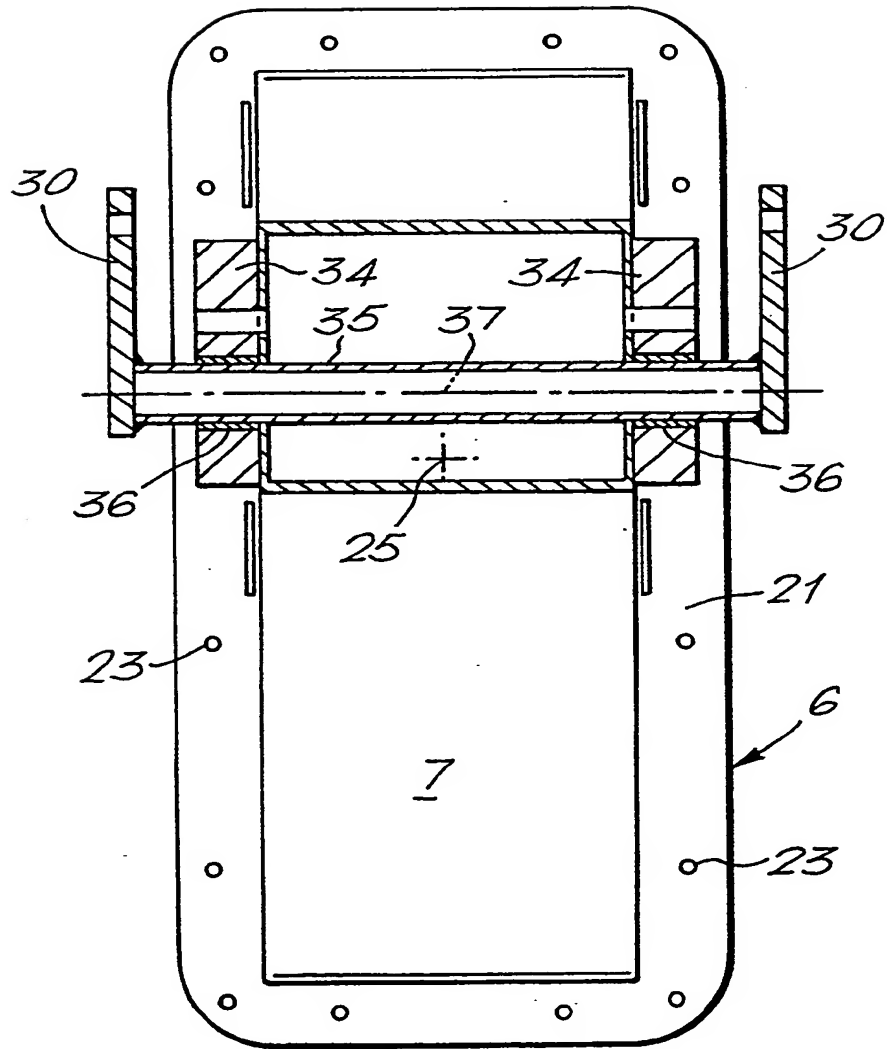


FIG.2.



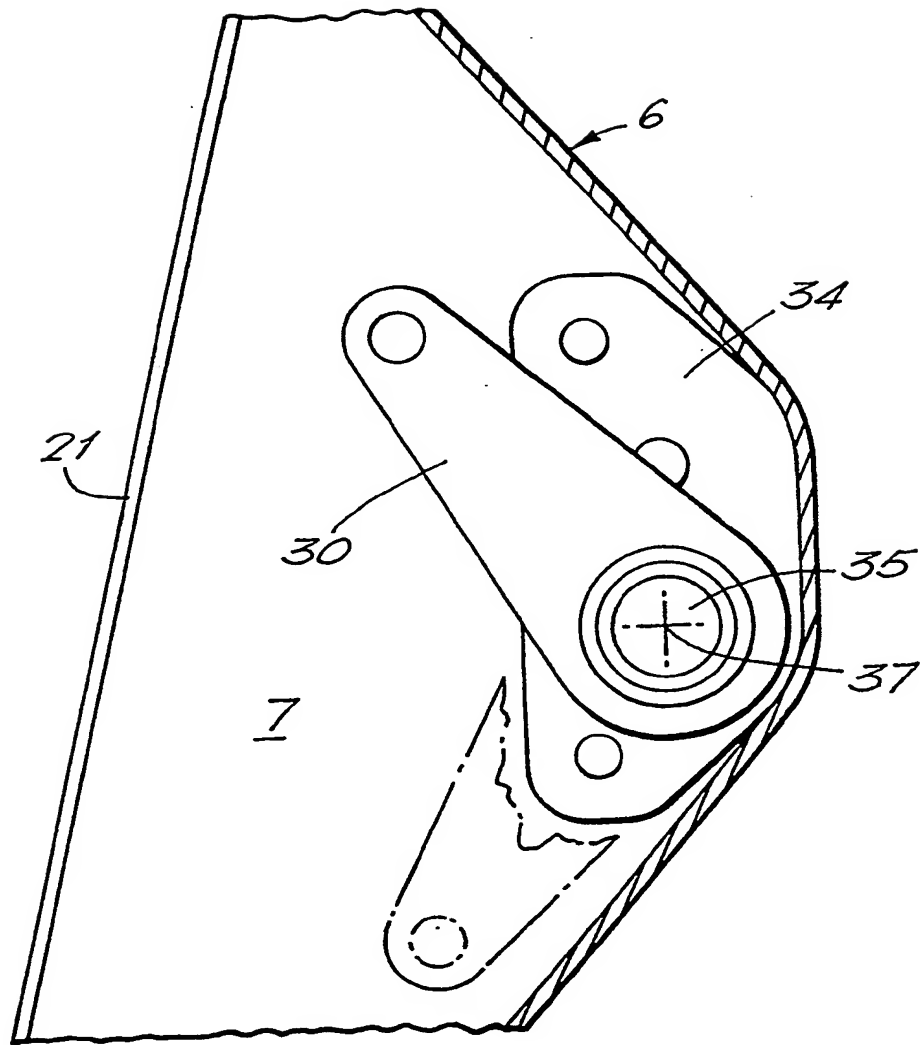


FIG. 4.

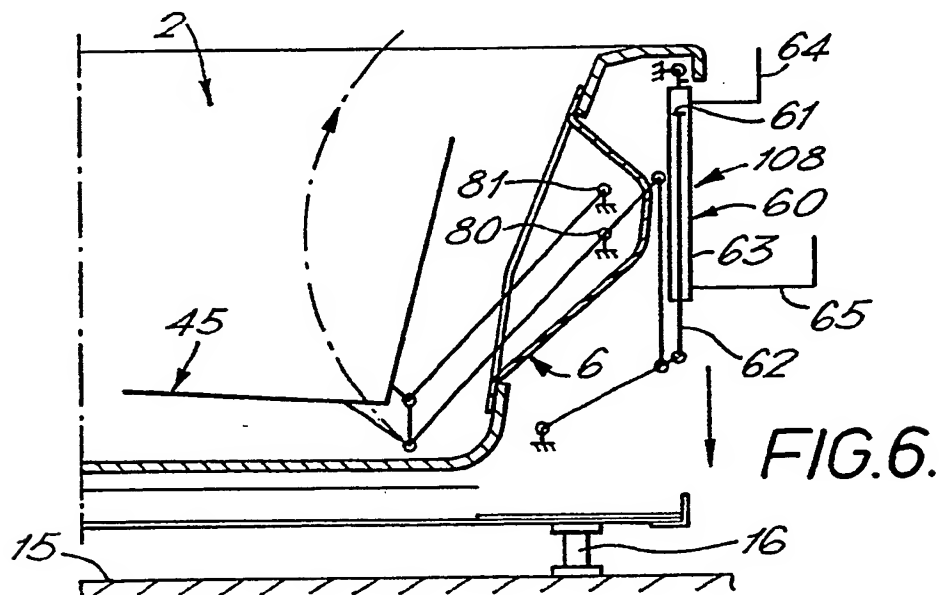
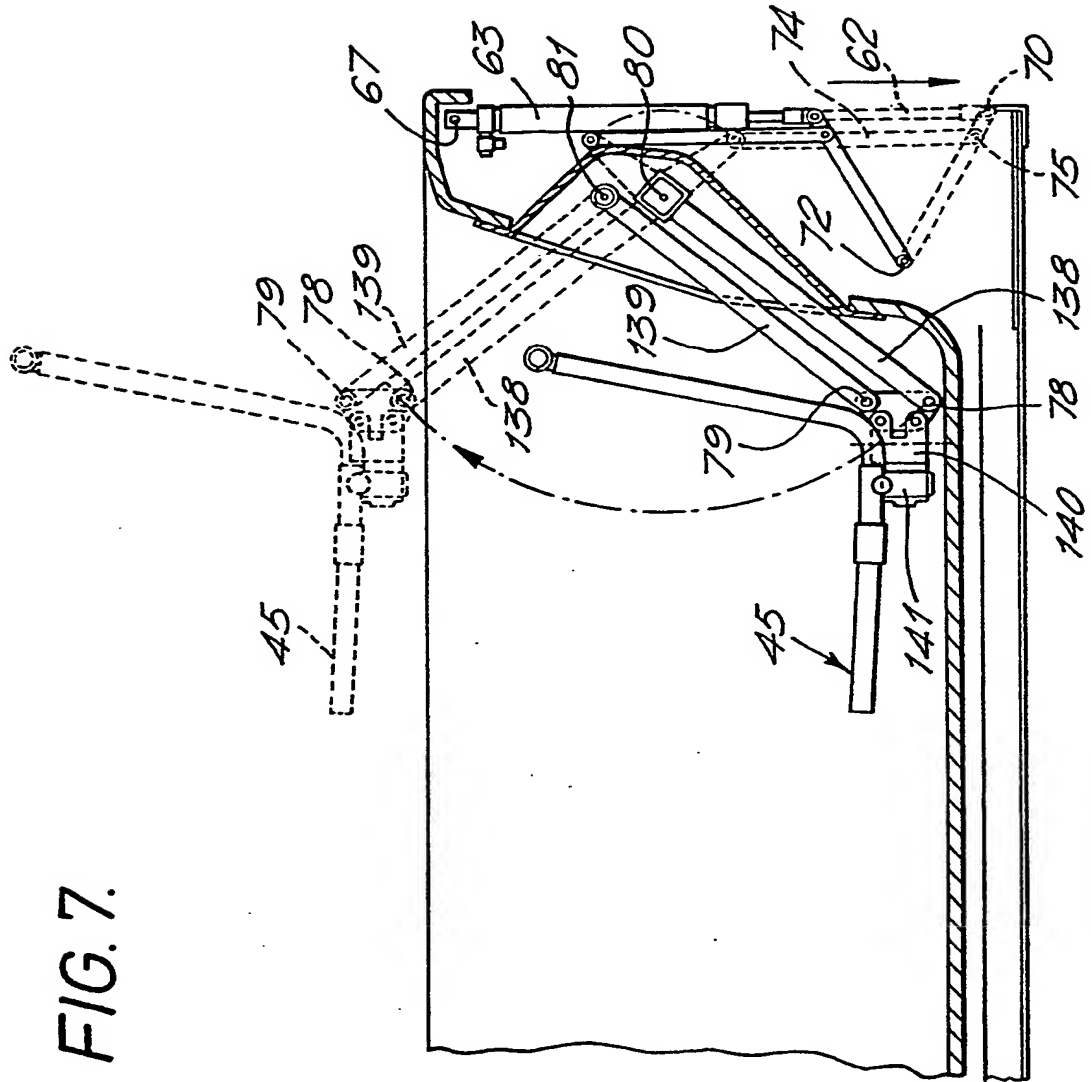


FIG. 7.



BATHS FOR USE BY PHYSICALLY HANDICAPPED PERSONS

This invention relates to baths for use by physically handicapped (or physically impaired) persons.

According to the invention, a bath for use by a physically handicapped person comprises:

a bath structure;

a seat support disposed within the bath structure;

means for raising and lowering the seat support within the bath structure, said means comprising mechanical linkage disposed within a housing forming an extension of the bath structure; and

actuator means for operating the mechanical linkage.

The housing may comprise a structure removably secured to the bath structure.

The actuating means may comprise fluid-operated bellows.

The mechanical linkage may comprise parallel links and arms, pivotally connected at one common end to the seat support and at the opposite common ends to a shaft rotatable by said actuating means.

An embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings, wherein:

Figure 1 is a fragmentary side view in section of a bath,

Figure 2 is an enlarged view of the housing 6 of Figure 1, looking in the direction of arrow II thereof,



Figure 3 is a fragmentary side view in section, which illustrates the actuating means 8,

Figure 4 is a fragmentary side view of the housing 6,

Figures 5 and 6 are semi-diagrammatic side view which illustrate modified actuating means, and

Figure 7 is a fragmentary side view in section of the arrangement illustrated in Figures 5 and 6.

With reference first to Figure 1, a bath 1 for use by a physically handicapped (or physically impaired) person comprises a bath structure 2, a rotatable seat support 3 disposed within the bath structure 2 and means 4 for raising and lowering the seat support 3 within the bath structure 2. The means 4 comprise mechanical linkage 5, disposed at least in part within a housing 6 forming an outward extension 7 of the bath structure 2, and actuator means 8 (Figure 3) for operating the mechanical linkage 5.

The bath structure 2, which is of the form favoured in Japan, is mounted above a support surface 15 by short pillars 16.

The actuator means 8 is mounted on a base support 17 supported in turn by the surface 15 whereby reactive loads applied to the means 8 are transferred to the surface 15.

With additional reference to Figures 2, 3 and 4, the housing 6 is disposed in a central opening 20 (Figure 3) defined by the bath structure 2 and formed in the seat end thereof. The housing 6 comprises a boxlike structure formed with a peripheral flange 21 whereby the housing is removably secured to the bath structure 2 by bolts 22, located by holes 23. A flexible gasket (not shown) is disposed between the flange 21 and surrounding parts of the bath structure 2, in order to provide a seal.

The actuator means 8 comprise a pair of fluid (water) operated bellows 24 disposed side by side on opposite sides of the

longitudinal axis 25 (Figure 2) of the bath structure 2.

Pressurised water is discharged to and from the interiors of the bellows 24 by way of ducts 26, in order to extend the bellows or allow them to retract. The pressurised water source comprises the cold water supply (not shown) to the bath 1. Water discharged from the bellows 24 is ducted to a drain (not shown).

The bellows 24 each have upper and lower end plates 27, 28. End plates 28 are secured to the base support 17. End plates 27 are pivotally connected, by way of links 29 to levers 30 mounted on opposite ends of a shaft 35. The shaft 35 extends through the opposite side walls of the housing 6 and is sealed to said walls by bearings 36 of rubberised material housed in support blocks 34, fixed to the housing 6. The shaft 35 is rotatable about a substantially horizontal axis 37.

With additional reference to Figure 1, the mechanical linkage 5 comprises pairs of lifting arms 38 and parallel links 39 with their common ends mounted on the shaft 35 (Figure 2) so as to be rotatable thereby. The other common or free ends are pivotally connected to a base 40 on which the seat support 3 is rotatably mounted by way of a spigot 41. A seat 45 is carried by the support 3

By operating the bellows 24 so as to expand them, the linkage 5 is caused to pivot upwardly, thus raising the seat 45 to a position whereby it is located just above the upper edge of the sides of the bath structure 2 where it can be pivoted by way of the spigot 41 so as to lie transversely of the bath structure. In this position, a physically disabled or physically impaired person can move onto and off the seat 45. When a person has moved onto the seat 45, the seat is moved about the spigot 41 so as to lie fore and aft of the bath structure, ie along axis 25. Water pressure in the bellows 24 is then released to cause the linkage 5 to swing downwardly and thus lower the seat 45 to the full line position shown in Figure 1.

Preferably the mechanical linkage 5 may be formed and arranged so that the seat 45 tilts slightly downwardly at its front end when in the raised position, and tilts slightly downwardly at its rear end when in the lowered position.

In a non-illustrated modification, the mechanical linkage 5 is disposed wholly, or substantially wholly, within the housing 6.

The housing 6 could be replaced by structure made integral with the bath structure 2, ie formed with the structure 2.

Figures 5, 6 and 7 illustrate a modification wherein the bellows 24 have been replaced by fluid actuator means 108 comprising a pair of side-by-side disposed fluid actuators 60.

Figure 5 shows the seat 45 lifted and Figure 6 shows the seat lowered. Figure 7 shows the seat 45 both in the lowered position and the raised (indicated by dotted lines) position.

The lowered actuators 108, which are operated by pressurised hydraulic oil, have internal pistons 61 and pistons rods 62. Oil is admitted to and from piston cylinders 63 by way of connections 64, 65 coupled to a combined hydraulic pump and control unit 66.

The upper end of each actuator 108 is pivotally secured by a pin joint 67 to an anchorage 68. The lower end of a piston rod 62 is pivotally connected, by a pin joint 70, to one end of a slave link 71, the other end of which is pivotally connected by a pin joint 72 to an anchorage 73.

At a point adjacent pin joint 70, one end of a link 74 is pivotally connected by a pin joint 75 to the slave link 71. The other end of each link 74 is pivotally connected by a pin joint 76 to an extension 77 of parallel link 138. The links 138, 139, which correspond to links 38, 39 of Figure 1, are pivotally connected to the seat 45 by pin joints 78, 79 and are pivotable about pin joints

80, 81 mounted on supports 82, 83.

The hydraulic system of Figures 5 and 6 provides improvements in speed and control over the water-powered system of Figure 3. It can operate at a higher working pressure, and does not need to discharge the working fluid to a drain.

Furthermore, it can operate at the same speed, regardless of the weight of the person using the bath. In addition, it is not dependent on local water pressures, which can vary considerably.

CLAIMS

1. A bath for use by a physically handicapped person comprising:

a bath structure;

a seat support disposed within the bath structure;

means for raising and lowering the seat support within the bath structure, said means comprising mechanical linkage disposed at least in part within a housing forming an extension of the bath structure; and

actuator means for operating the mechanical linkage.

2. A bath as claimed in claim 1 wherein the housing comprises a structure removably secured to the bath structure.

3. A bath as claimed in claim 2 wherein the bath structure defines an opening and the housing comprises a boxlike structure disposed within the opening.

4. A bath as claimed in claim 3 wherein the housing has a peripheral flange whereby the housing is detachably secured to the bath structure.

5. A bath as claimed in any one of claims 1 to 4 wherein the actuating means comprise fluid-operated bellows.

6. A bath as claimed in claim 5 wherein the bellows are operable by water.

7. A bath as claimed in any one of claims 1 to 4 wherein the actuator means comprise hydraulic powered actuator means.

8. A bath as claimed in any one of claims 1 to 7, wherein the mechanical linkage comprises parallel links and arms pivotally connected at one common end to the seat support and at the opposite common ends to a shaft rotatable by said actuating means.

9. A bath as claimed in any one of claims 1 to 8 wherein the seat support is rotatable so that when it is in an upper position it can be pivoted to lie transversely of the bath structure.

10. A bath for use by a physically handicapped person, substantially as hereinbefore described, with reference to Figures 1 to 4 of the accompanying drawings.

11. A bath for use by a physically handicapped person, substantially as hereinbefore described, with reference to the accompanying drawings, modified substantially as hereinbefore described, with reference to Figures 5 and 6 of said drawings.

**Examiner's report to the Comptroller under  
Section 17 (The Search Report)**

Application number

GB 9224389.8

**Relevant Technical fields**

(i) UK Cl (Edition L) A4N (N2D2, N8B)

(ii) Int Cl (Edition 5) A47K; A61G

**Databases (see over)**

(i) UK Patent Office

(ii)

**Search Examiner**

S J CHURCH

**Date of Search**

3 MARCH 1993

Documents considered relevant following a search in respect of claims

1-11

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X	GB 2242126 A (ARJO) see especially Figure 3	1, 7 and 9
X	GB 2222767 A (PARKER) see Figure 1	1, 7 and
X	WO 85/05267 (HAMPSHIRE) see Figure 1	1, 7 and 9
X	US 4296508 A (MORAN) see Figures	1, 7 and 9
X	US 3994030 (CASSELL) see Figure 1	1, 7 and 9

SF2(p)

TP - doc99\fil000591

Category	Identity of document and relevant passages	Relevant to claim(s)

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